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Practices and pitfalls of competitive resilience: Urban adaptation as real estate firms turn climate risk to competitive advantage

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ABSTRACT

Coastal cities on the U.S. East Coast are emerging hotspots of global sea level rise as well as increasingly attractive real estate markets. In this context, proactive real estate firms are engaging in various strategies for flood risk management. Analyzing firms' urban adaptation practices, this paper builds on theories of growth coalitions and climate change imaginaries, identifying forms of resilience that promote an ascendant competitive resilience regime. The most proactive firms treat resilience as a competitive advantage to be gained through self-reliant or networked adaptation. As firms act to limit financial exposure and protect their assets, the resulting piecemeal, competitive resilience further accentuates uneven risk and uneven development. While it may hold short-term promise, this approach contributes to larger trends in neoliberal urban governance, threatening to undermine the potential for more transformative regional adaptation. However, given municipal resource constraints, it could become a common and damaging form of urban adaptation.

1. Introduction: converging sea level rise and real estate hotspots

As centers of commercial and industrial activity, immigration, and finance, coastal cities in the U.S. have historically played a key economic role. While these cities have attracted real estate capital for decades, if not centuries, they have been buoyed by renewed interest since waterfront revitalization took hold in the 1960s and 70s (Desfor and Laidley, 2011; Heeg, 2011; Hill, 2013; Leary and McCarthy, 2013). In an economy increasingly characterized by “jobs chasing employees,” revitalized waterfronts, attractive to the millenials and creatives who live, work and play there, attract commercial real estate investment. However, in a changing climate, more severe storms, more intense precipitation, and sea level rise magnify the risk of flooding in these same cities. While some flooding will be of headline grabbing magnitude, “nuisance flooding” may have an equal impact as stormwater systems are taxed beyond capacity and insufficient seawalls are routinely overtopped (Melillo et al., 2014; Sweet et al., 2014).

Organizations ranging from Risky Business, co-founded by Henry Paulson,[1] to the UN's newly formed R!SE Alliance have been sounding the alarm that the exposure to climate risk could be devastating for business, including commercial real estate. Operating in more measured tones, though equally alarming, leading climate scientists have noted the high level of asset exposure in the U.S. Currently, North America has the highest value of exposed assets globally,[2] a situation exacerbated by the relative lack of flood defenses in comparison to other high income countries such as the U.K., Japan, and the Netherlands (Hallegatte et al., 2013; Hanson et al., 2011). By 2030, average annual losses from storm damage along the Eastern Seaboard and Gulf of Mexico could reach $35 billion (Bloomberg et al., 2014).

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[1] Secretary of the Treasury in the George W. Bush administration from 2006 to 2009.

[2] Though asset exposure in Asia is projected to surpass North America by the 2070s.

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While every major American city has formalized the need for climate change mitigation and adaptation in some capacity, this effort is constrained to paper planning and piecemeal implementation except in those cities galvanized by major storms (Bierbaum et al., 2013; Lee and Painter, 2015; Romero-Lankao, 2012). In New York and New Orleans, federal, state, and local agencies have made post-disaster investments in large (though potentially still inadequate) flood infrastructure projects. But proactive funding for super-levees, raised districts, or "room for the river" projects common in Northern Europe and Japan is entirely lacking in the U.S. (Hill, 2013).

In the absence of a concrete, coordinated public response to flood defense, the real estate industry might be expected to take note of flood risks for existing buildings, specifically potential losses communicated in clear financial terms. This is especially urgent for existing assets that will be increasingly vulnerable if left in their current condition. However, in the real estate and broader financial industry, real estate is perceived as a stable investment, an obvious choice for retirement funds and sovereign wealth funds as well as a safe harbor for global capital (Armstrong, 2013; CBRE Global Investors, 2015; Green-Morgan et al., 2013; Schreckinger, 2014). In conventional real estate market assessments, climate risks barely register. Climate change is still treated as a niche issue, addressed in conferences, reports, and special meetings focused on sustainability or more recently resilience.[3] It is compartmentalized as a trend real estate professionals might choose to heed, much like big data (Kelly and Warren, 2015).

The potential conflict between real estate interests and sea level rise in coastal cities gives rise to the following research questions: 1. How do senior decision-makers in commercial real estate firms conceptualize flood risk? In more theoretical terms, in what ways do their conceptualizations of climate risk reflect larger climate imaginaries? 2. Further, what risk management practices do they employ? How do these practices articulate with the imaginaries involved and what forms of resilience do these imaginaries and practices co-construct?

In this study centered on real estate professionals and their interests within an urban setting, I rescale the concept of climate imaginaries within socioeconomic regimes from the national to the urban to illuminate the forms of resilience these firms adopt as they imagine and practice resilience. Examining how economic, and more specifically climate, imaginaries operate at the urban scale extends the explanatory power of this theoretical construct beyond national politics to an increasingly central scale of action for adaptation.

This analysis of forms of resilience at the local level may be particularly apt for analyzing the production of piecemeal urban resilience, a process that is inherently fraught with conflict over basic assumptions concerning the purpose and value of land use. As few cities have the resources of a New York or London to protect their economic interests from climate change, the consequences of piecemeal, private sector-led resilience will be increasingly important to understand. Understanding this ascendant competitive resilience regime, both theoretically and practically, will be critical to evolving land use planning for climate change adaptation in secondary cities.

2. Methods

2.1. Case selection: Boston, engaging the private sector to address sea level rise

A historic coastal city ranked in the top five for asset exposure to flooding and in the top ten for real estate markets in the U.S., Boston offers a representative case of competing climate change and real estate dynamics (Hallegatte et al., 2013; Kelly and Warren, 2015). The Hallegatte et al. data indicates that Boston could face average annual flood losses of US$237 million given current levels of flood protection. Unlike the other cities in the top five, Boston has not experienced a major storm, but did weather Hurricane Sandy's near miss; if Sandy hit just five hours earlier, at high tide, Boston would have been devastated like New York (Douglas et al., 2013). While major storms have directly impacted New York, New Orleans, Miami, and Tampa, the other cities in the top five, Boston only experienced minor flooding during Sandy. Active participants in Boston's resilience efforts, from city hall to The Boston Harbor Association, consistently emphasize this close call in their attempts to motivate a proactive response (Aiken et al., 2014; Quinn, 2014; Spector and Bamberger, 2013).

Like other American cities, Boston has undertaken formal public sector planning efforts, creating a *Climate Action Plan*.[4] The city is implementing small-scale infrastructure such as solar arrays to maintain fuelling stations, but large-scale infrastructure is only being discussed in speculative terms through ideas competitions and reports.[5] This is unlikely to change in the absence of a Sandy-scale disaster. However, Boston is also significantly enrolling the private sector, notably by forming a "Green Ribbon Commission" convening business, institutional and civic leaders to provide private sector support for implementation of the Climate Plan.[6] This commission is a unique organization which other cities look to as a model according to multiple interview respondents.

One of six working groups[7] in the Commission, the Commercial Real Estate group is comprised of leading property owners, and their work is coordinated by A Better City, a nonprofit formed in 1989 to advocate for business interests over the course of the Central

[3] The term 'resilience' can be problematic on multiple counts: it risks meaninglessness as another green buzzword or through becoming a cover for a neoliberal urban growth agenda (Davoudi et al., 2012). However, the term has become commonplace throughout business, government, the media and adaptation practice. Given that the term has currency within the real estate industry, I have chosen to use it here in an effort to capture the industry's own framing of the issue.

[4] The culmination of the city's triannual climate planning process to reduce GHGs and plan for adaptation.

[5] A limited sample of reports and related events include: Climate Ready Boston, Building Resilience in Boston, Designing with Water, Living with Water, Sea Level Rise and the Future of Coastal Cities, and Preparing for the Rising Tide.

[6] http://www.greenribboncommission.org/.

[7] The other working groups are the following: Health Care, Higher Education, Climate Preparedness, Greenovate Boston, and Transportation.

Artery Project.[8] After fulfilling its initial mission, A Better City reoriented itself toward a more generalized agenda of improving economic competitiveness in the Boston region, representing its membership of 'leading real estate market participants' as it facilitates transportation, land development, and environmental initiatives. In July of 2014, the relationship between A Better City and the City of Boston was formalized in an MOU to support "their common goals of improving the sustainability and economic competitiveness of commercial properties in the City (City of Boston and A Better City, 2014)."

Significantly, Boston seeks to position itself as a global leader on climate adaptation and recently celebrated its admittance to the C40 group of cities, a global network of large cities addressing climate change. Outlining preparation for a climate finance summit, the Green Ribbon Commission made it a goal to "support the development of Boston as a global center of excellence in climate finance[9] (GRC, 2014)." In February 2015, The City of Boston hosted the U.S. launch of the R!SE Initiative, a U.N. program dedicated to making investments disaster risk sensitive globally.

While Boston is a representative case of climate change and real estate dynamics, it offers an extreme case of enrolling the private sector to address flood risk. Miami bears the highest risk from sea level rise in the United States (Hallegatte et al., 2013), yet comparative research with senior decision-makers in real estate I conducted there reveals that sector taking far less action and maintaining a high confidence that local government will address the risk through building codes. Therefore, the Boston case is uniquely positioned to illuminate emerging consequences of private sector leadership for adaptation. However, further research in this area would benefit from more in-depth comparative case studies of multiple cities, as noted in the limitations section (Section 2.2.4).

2.2. Case study method

To explore commercial real estate firms' conceptions of resilience, I employed an inductive case study approach with mixed methods (Creswell and Poth, 2017; Flyvbjerg, 2006; Yin, 2013). I conducted semi-structured interviews with senior decision-makers in commercial real estate firms regarding their perceptions of and responses to flood risk, supplemented by participant observation of conferences and meetings, and content analysis of documents directly related to the case or referred to by respondents.

2.2.1. Operationalization

I operationalize the theoretical concept of the techno-market imaginary in terms of prioritizing financial risk above other types of risk and the move to turn risk into opportunity. I operationalize risk in terms of flood risk as this is a tangible component of climate risks which respondents had direct or proxy experience with and therefore were able to engage with.

2.2.2. Respondent sampling

Through several sampling methods, I identified senior[10] decision-makers in commercial real estate firms with high value assets in Boston's urban waterfront core. In the first phase, I compiled data on the largest commercial property managers in Massachusetts and the largest office buildings in greater Boston (Boston Business Journal, 2014). I identified the proximity of those assets to the 1:100 year floodplain based on the revised FEMA map of 2013 to determine that at least some of those major assets were "objectively" exposed to flood risk.

Reviewing this list of potential firms with an Urban Land Institute (ULI) staff member, I gained a key informant's insight into relevant respondent firms. While this step introduced a level of selection bias, it was also a prerequisite to accessing this relatively closed, "elite" community (Desmond, 2004; Reed, 2012). The key informant identified respondent firms that held a mix of property types, including class A and B office space and some high-rise residential. Out of fourteen firms, I gathered substantive responses from ten, three by email and seven through interviews including one firm that provided access to four individuals in different roles. Characterizing the firms after the interviews, I classified them into categories based on the markets in which they operate, resulting in four global, four target market,[11] and two local firms.

2.2.3. Data collection and analysis

2.2.3.1. Interviews. After developing a semi-structured interview guide addressing flood risk perception and practices, I reviewed the guide with a senior decision-maker in real estate in New York and a small ULI-coordinated group of senior decision-makers in the public sector and institutions to determine reliability. I received consent to record nine out of ten interviews. After fully transcribing them, I coded them according to preliminary categories that emerged from the interviews. The majority of respondents did not consent to be quoted; I do not use any direct quotes as the limited sample I received permission to use would not be representative.

2.2.3.2. Participant observation of meetings and conferences. Meetings and conferences provided a significant source of internal validity as both respondents and their peers presented there. Observing senior decision-makers in forums alternative to the individual interview offered a reference point for the way they present themselves to an audience within their industry or within a related

[8] Known colloquially as the Big Dig, this project to reroute I-93 underground and redevelop the surface as a greenway lasted from 1991 to 2006.

[9] Based on the GRC (2014) materials outlining a climate finance summit for 2015, this is defined as "ways that global capital markets are beginning to respond to the risks and opportunities of climate change."

[10] Senior generally corresponds to a managing director or vice president level.

[11] "Target markets" is a term used in the industry to denote primary urban markets with knowledge-based economies and supply constraints (i.e. Boston, New York, San Francisco).

interest group. Real estate industry meetings provided a broad comparative context, while meetings integral to the Boston Climate Action Plan/Green Ribbon Commission process provided an internal comparative context. Informal interviews with senior decision-makers involved in climate action planning in public, nonprofit, and institutional roles provided a comparison across sectors.

2.2.3.3. Content analysis of reports and minutes. Content analysis provided an additional check on internal validity. I reviewed *A Better City* reports directly targeted at the commercial real estate industry; as these were published for a wider audience than the conferences and meetings they were created in conjunction with, they provide insight into the tone and content expected to reach the industry at large. I also analyzed the Green Ribbon Commission's publicly available meeting minutes and presentations. In addition, I asked respondents for reports or research that had been important to them in shaping their flood risk management strategies and reviewed the documents that they referenced.

2.2.4. Limitations

This research has major limitations to generalizability in both sampling method and sample size. Rather than using a key informant for sampling, it would be more revealing to identify a cross-section of large firms working in the office and residential commercial real estate markets. Additionally, a more robust typology could be developed with more attention to types of firms and representative samples of each. In order to generalize across major coastal cities, it would be necessary to compare between locations where the same types of firms operate.

3. Theoretical framework: analyzing the growth coalition through climate imaginaries

3.1. The growth coalition evolves to theorize urban resilience

Positing real estate professionals as key agents producing the built environment in collaboration with other pro-growth interests evokes one of the more enduring theories of urban development, the “growth machine” thesis. In his 1976 proposition of “the city as a growth machine,” Harvey Molotch argued that powerful local business, government, and cultural actors coalesce around the goal of local land development for the sake of economic growth (Logan and Molotch, 2007; Molotch, 1976). Two decades later, Logan, Whaley, and Crowder examined this argument in detail, finding that a key hypothesis, that “local politics revolves around land development” has been borne out in two decades of research on American cities and towns. They also note an underlying hypothesis which promises to have a greater impact on the shaping of urban futures: that social and environmental goals are irrelevant on their own terms, that they only matter to the extent that they impact development (Logan et al., 1999). This speculative thread provides an essential frame for understanding the role of contemporary resilience planning.

Jessop et al. argue that the “growth machine” has some further limitations. They caution against frequent interpretations which assign decisive power to local actors, noting instead that their political power is “‘licensed’ by the state,” forming part of a larger government restructuring away from the provision of public services (Jessop et al., 1999). In the case of Boston's preparations for sea level rise, this licensing is evident both in the formation of the Green Ribbon Commission and the Memorandum of Understanding between A Better City and The City of Boston, and it is reinforced by a comment from the Chief of Environment, Energy and Open Space to the Commercial Real Estate Working Group that “the climate protection plan is a commerce protection plan (GRC, 2015).” In a context of constrained resources, the City of Boston not only pragmatically leverages private sector wealth, but formally incorporates the private sector into its governance structure, endorsing these efforts to maintain the city's competitiveness.

In their preface to the 20th anniversary edition of *Urban Fortunes*, Logan and Molotch caution that an environmental agenda can too easily be subsumed within growth goals, trivializing sustainability. Accordingly, the “growth machine” thesis now informs critical urban theory that foregrounds the effects of climate change on the built environment. Hodson and Marvin, geographers focusing on sustainable urban futures, argue that while “ecological security” usually has currency in terms of infrastructure and resources at the national scale, the term comes to have a unique and identifiable form at the urban scale. In their research on world cities such as London, New York and San Francisco, they find coalitions mobilizing to promote resilient infrastructure and resource security in service of long-term economic growth (Hodson and Marvin, 2010, 2009). However, they caution that these infrastructure enhancements will exacerbate uneven development and displace vulnerability. Though they focus on world cities, they note that second tier and ordinary cities are likely to adopt similar models, in more piecemeal fashion.

Mark Whitehead further develops a critical urban theory of climate change, arguing that the limits of “autonomous adaptation,” or the reliance on markets to provide climate protection, have already been exposed (While and Whitehead, 2013; Whitehead, 2013). Competitive approaches to adaptation, while ranging across a spectrum through various forms of neoliberalization (Brenner et al., 2010), all widen an “adaption capacity gap” that can only be addressed through collective, inclusive approaches to adaptation that prioritize a climate agenda for more than its market value. Under a regime of inclusive adaptation, a full range of at risk communities would be engaged and resources would be deployed in a coordinated manner to provide equitable climate protection (Anguelovski et al., 2016; Pelling et al., 2011; Shi et al., 2016). This offers a safeguard against merely shifting vulnerability to less privileged populations, one of the most common forms of maladaptation (Barnett and O'Neill, 2010; Juhola et al., 2016).

Further building on Logan and Molotch's work, Bohland et al. argue that addressing resilience as a value-neutral, unalloyed good comprises a multi-scalar “resilience machine” in the making with injurious implications for social justice and all aspects of political life (Bohland et al., 2018).

In all of these arguments, scholars consistently refer to active coalitions and elites, but these largely remain a black box (Nielsen, 2014), glossed over and essentialized. One notable exception is Shelley Kimelberg's glance “inside the growth machine” where she

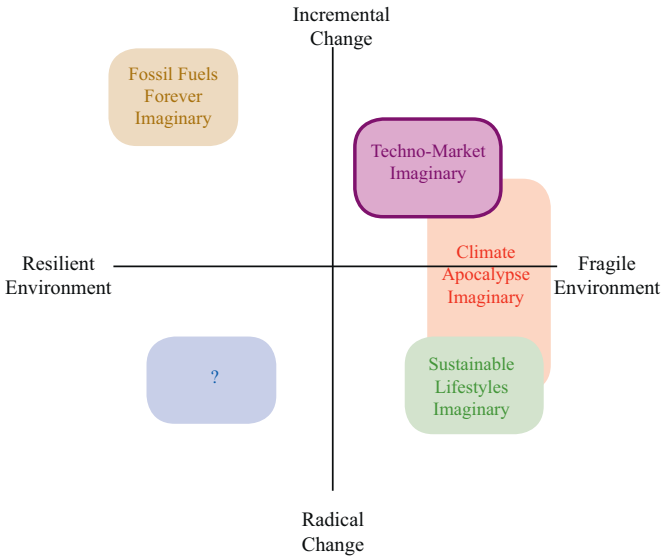

Fig. 1. Climate change imaginaries (Levy and Spicer, 2013). Levy and Spicer identify four climate change imaginaries which encapsulate cultural perspectives on environmental change. The techno-market imaginary reflects the attitude that the environment is somewhat fragile and incremental change is sufficient to address environmental challenges. This attitude is alive and well among thought leaders in the real estate industry. Figure redrawn and emphasis added. Reprinted with permission.

finds through in-depth interviews with real estate professionals that they perceive their power in the urban development process to be limited (Kimelberg, 2011). Emphasizing the terminology "growth coalition," she more accurately allows for the complexity of urban politics and development than the mechanical "growth machine" metaphor.

3.2. Organizational theories of climate change

While urban sociology and critical urban theory help to frame the politics of place, and suggest that political actors exercise power to secure their competitive position, they stop short of helping to conceptualize the economic and ecological worldviews of those actors. Examining these worldviews through organizational theory helps to more robustly explain real estate firm actions within networks and ultimately in the urban field.

Reviewing the organizational landscape of climate change, Wittneben et al. note the limitations of strategic, institutional, and political economy frameworks for understanding corporate inertia, and instead propose a framework based on the mutual reinforcement of "imaginaries" and material realities to create socioeconomic regimes (Wittneben et al., 2012). Doing so, they build on Jessop's formulation of "economic imaginaries" in contrast to the "actually existing economy." He theorizes the "knowledge-based economy" as an example of the way in which complex, contradictory aspects of the economy can be reduced into a discrete package, privileging certain economic activities as objects of competition and/or regulation (Jessop, 2010). In simple terms, Wittneben et al. suggest that "an imaginary generates a sense of shared meaning, identity and interests within a network of actors." When imaginaries and the material realities of economic structures mutually reinforce each other, they tend to create socioeconomic regimes that outcompete alternatives.

Levy and Spicer apply this formulation to climate change, conceptualizing "climate imaginaries" as shared interpretations of climate change that compete among each other for ascendance (Levy and Spicer, 2013; Wright et al., 2013). They identify four core imaginaries in the conceptualization of climate change. The one I emphasize here is the "techno-market imaginary" (Fig. 1) which embodies optimism that organizations can adequately address environmental problems through technological and market solutions, becoming more competitive as a result. This is one manifestation of the larger concept of ecological modernization which posits that environmental reform is adequate to transforming environmental challenges into opportunities (Jänicke, 2008; Mol et al., 2014; Pattberg, 2012). This also reflects the uncritical win-win position favored in most management literature and many management positions (Linnenluecke et al., 2013; Okereke et al., 2012; Rickards et al., 2014).

Levy and Spicer's analysis of climate change politics resides at the national scale, however resilience is increasingly an urban-centered issue as Hodson and Marvin (2009, 2010) note. As specifically urban processes, land use and development systems contribute to the creation of socioeconomic regimes, tethering climate imaginaries to the urban scale. As imaginaries can only gain power when they resonate with material practices (Wittneben et al., 2012), these urban processes link the techno-market imaginary to the production of the built environment. In this paper, I examine this techno-market imaginary at a more granular level than previously done, developing a framework for its operation within the real estate sector. Further, I examine how real estate firms' flood risk practices resonate with the core of the techno-market imaginary to form a regime characterized by "competitive resilience."

Table 1
Real estate firms' perceptions of flood risk as financial risk. Flood insurance, flood experience, proxy experience, and consultant input were the four key factors that most significantly influenced firms' perceptions of flooding as a financial risk. (Firms represent three categories: G = global market operation, T = target market operation, L = local market operation.)

Perception factors	Respondent firms									
	G1	G2	G3	G4	T1	T2	T3	T4	L1	L2
Flood insurance	X		X	X		X	X	X	X	
Flood experience				X	X	X	X	X		
Proxy experience					X	X	X	X		
Consultant input				X		X		X		
Clients					x			x		
Conferences					x		x			
Media			x		x					
Property mgmnt. cos.						x				
Regulations	x									
Litigation						x				
Investors	x									

4. Findings

Findings are presented in three parts, corresponding to the research questions. The first part discusses real estate decision-makers' conceptualizations of flood risk as these operate within the techno-market imaginary, focusing on the relationship between flood risk and competitiveness. The second part analyzes their existing risk management practices on a continuum from self-sufficiency to collaboration. The third part synthesizes these imaginaries and practices into a framework that distinguishes forms of resilience. The subsequent discussion section analyzes how the most prominent of these forms contribute to a competitive resilience regime and the implications of this regime for the wider landscape of urban adaptation.

4.1. Conceptualizing flood risk as competitive opportunity

Though Levy and Spicer note that the techno-market imaginary has been at an impasse in national politics since 2009, the tone of ecologically enlightened self-interest within Boston's growth coalition and those of other leading cities suggests that the techno-market imaginary is alive and well in some regional and local contexts, whether harnessed to climate change or other realms of urban innovation. This is apparent in the real estate industry as “thought leaders” tend to optimistically address climate change as ripe for free market management. A comment targeted at commercial property owners at a recent disaster conference in Boston is representative: “Urban fire was the climate change of its time … within 50 years, urban morphology was transformed because capital demanded it (Douglas, 2015).” This bold pronouncement is seemingly buttressed by analysts' dire warnings of vast financial losses due to flood risk in business reports and U.N. documents (Bloomberg et al., 2014; UNISDR, 2015). These warnings are accompanied by the converse message that business leaders must take drastic action. However, in the conservative mainstream of the real estate industry, this message is sidelined. For example, at a recent industry event, climate change risks were cushioned within the vague category of “event risk” without any dollar figure attached, though other factors, such as available investment capital, were conveyed in dollar terms (Kelly and Warren, 2015). Echoing this stance on climate risk, many of the respondents suggested that flood risk was a relatively minor risk, just one among many, from the employment market to the potential for civil unrest in a given location. In a list of ten items, flood risk might make number ten, or alternatively, it is just one of 100 items on a checklist. Within their attempts to convey the relative insignificance of flood risk, their discussion of risks always settled into financial terms; unsurprisingly, for flood risk to register, it must be perceived as a financial risk.

This translation into financial terms resulted from several major contributing factors (Table 1). Flood insurance emerged as the primary factor, which is predictable given that all firms are required to obtain flood insurance for any exposed properties[12] when borrowing money from a federally insured lender. However, insurance was generally treated as a reliable way to compartmentalize flooding rather than an indication of significant financial impact. The second major factor was direct flood experience, typically in buildings in another city for those firms with assets in multiple locations. Though fewer firms mentioned it, it was more persuasive than quotidian interactions with the insurance industry. Some firms had experienced business interruption, buildings that “went black” for up to several months as a result of Superstorm Sandy. While this did not necessarily represent a major financial loss in the context of their portfolio, it was enough of a loss to raise warning flags. This reporting of the persuasive power of direct experience is well supported in much of the flood risk literature (Birkholz et al., 2014; Kellens et al., 2013; Lujala et al., 2014). The third and related factor was proxy experience, in which firms did not directly take a hit from a storm, but owned assets in a location where other firms sustained damage. In one case, a firm sent a team to conduct a post-mortem investigation of the consequences of flooding

[12] Where properties are located within high-risk areas as defined by FEMA and have a mortgage from a federally regulated or insured lender, those property owners are required to purchase flood insurance. Properties outside of high-risk areas may still be subject to flood risk; insurance for those properties is not required, but is available (floodsmart.gov).

for other owners' properties. The fourth significant factor was consultant input, often solicited during the due diligence phase of an acquisition process. These four factors arose frequently, suggesting that they are reliable pathways to real estate decision-makers perceiving flood risk as a financial risk. Respondents also reported on the relatively minor influence of factors such as client requests and regulations.

Critically, those firms that perceived flood risk as a financial risk went beyond noting the downsides and found ways to frame this risk as a business opportunity. This is unsurprising; treating risk as opportunity is intrinsic to the techno-market imaginary. This position is also consistent with the tenets of ecological modernization which hold that ecological crises do not set limits, but rather present opportunities to develop economic competitiveness through innovation. Proactive firms' responses were consistent with this imaginary, reflecting the belief that incremental change would be adequate to address, overcome, and benefit from the vagaries of a fragile environment. For example, one respondent noted that the firm had experienced flooding elsewhere and retrofitted the affected and adjacent buildings in response, subsequently turning those measures into selling points in promotional material. In a similar vein, that respondent touted high scores in sustainable business and building rating systems as a valuable sales and leasing feature. Another respondent described his firm's unique position in creating long-term value by fortifying assets as well as the importance of those measures in retaining anchor tenants. Another respondent boiled down these types of measures to "good business." For another firm, business interruption was perceived as a significant liability, to be avoided in the future. These respondents frequently noted their own exceptionally competitive position, or the strength of their response in comparison to other firms in the field. They perceived the risk as an opportunity to position themselves as leaders in a changing market.

Reinforcing this emphasis on competitiveness, industry leaders suggest that changing conventional practice in the absence of a major disaster would depend on short-term financial logic, especially given the short investment horizon (two-ten years) typical in the industry. At A Better City's public launch of the *Enhancing Resilience in Boston*[13] report, panelists advised that flood adaptation would only gain traction as a "value proposition," offsetting potential losses from business interruption. This business impact argument is the entire premise of the U.N.'s R!SE Initiative, which aims to galvanize adaptation through making investments disaster risk sensitive. Development industry leaders perceive impact on competitiveness, and even better, competitive advantage, as the linchpin in the argument for a widespread response; this also appears to be the major catalyst for firms that are already responding.

4.2. Practicing flood risk management as competitive strategy

Firms alert to both the financial risk and opportunity of flooding did pursue risk management beyond minimum insurance requirements. Nevertheless, they frequently emphasized a cap on their willingness to invest in flood protection, noting that it had to be contained to a "reasonable cost." In some cases, respondents noted that cost was a barrier to moving beyond planning and organizational strategies to building upgrades. One respondent noted that while city officials in New York frequently refer to moving mechanical systems as a simple solution, that suggests ignorance of financial and construction realities; it is "extraordinarily expensive" to implement such measures and therefore unrealistic. However, some respondents did identify particular exposed buildings where they were willing to invest in the necessary concrete solutions, such as installing pumps, moving mechanical equipment, or raising the base elevation.

This cautious, incremental approach was primarily motivated by keeping costs down, but augmented by firms' preference for short-term planning. When addressing the question of how they had incorporated flood risk into their strategic planning or operations, most respondents immediately made the connection to emergency planning. In other words, they tended to conflate flood risk with short term crises resulting from hurricanes or storm surge rather than the long term, slow onset, and ultimately more damaging risk of sea level rise. Against this baseline of fiscally constrained resilience practices in response to relatively short term risk, a range of strategies, some self-sufficient and some collaborative, stood out.

4.2.1. Self-sufficiency

One respondent taking the self-sufficient approach reported creating organization-wide policies for emergency response, such as the timing of building evacuation, to insure consistency across all of their assets in multiple locations. Another respondent noted purchasing generators, stocking certain supplies such as plywood on site, and contracting with vendors for the provision of additional supplies such as fuel in the immediate aftermath of a "disaster." As a first and last resort, some respondents noted avoiding exposed properties, either shedding them after flood events, or proactively avoiding "at risk" areas.

4.2.2. Collaboration

One respondent taking the collaborative approach delved into procedures for internal emergency planning, or "tabletop" exercises, noting that both public and non-profit emergency service responders were invited to these sessions. He related this as an effort to build capacity on both sides: the emergency services could better fulfill their duties during an incident if they had familiarity with particular buildings; at the same time, the firm would be better served by providers who had this detailed knowledge and a personal relationship with the firm.

Some firms that made capital upgrades took the additional step of networking and advocacy at resilience-oriented events to disseminate and learn "best practices." For example, one respondent advocated for premium discounts for resilience to insurance industry colleagues at conferences and gave presentations on his own firms' foresighted emergency preparations. Another respondent contributed to an industry association report on best practices after Hurricane Sandy, subsequently using that report as a reference

[13] A report and toolkit on flood protection strategies for owners of large buildings and institutions.

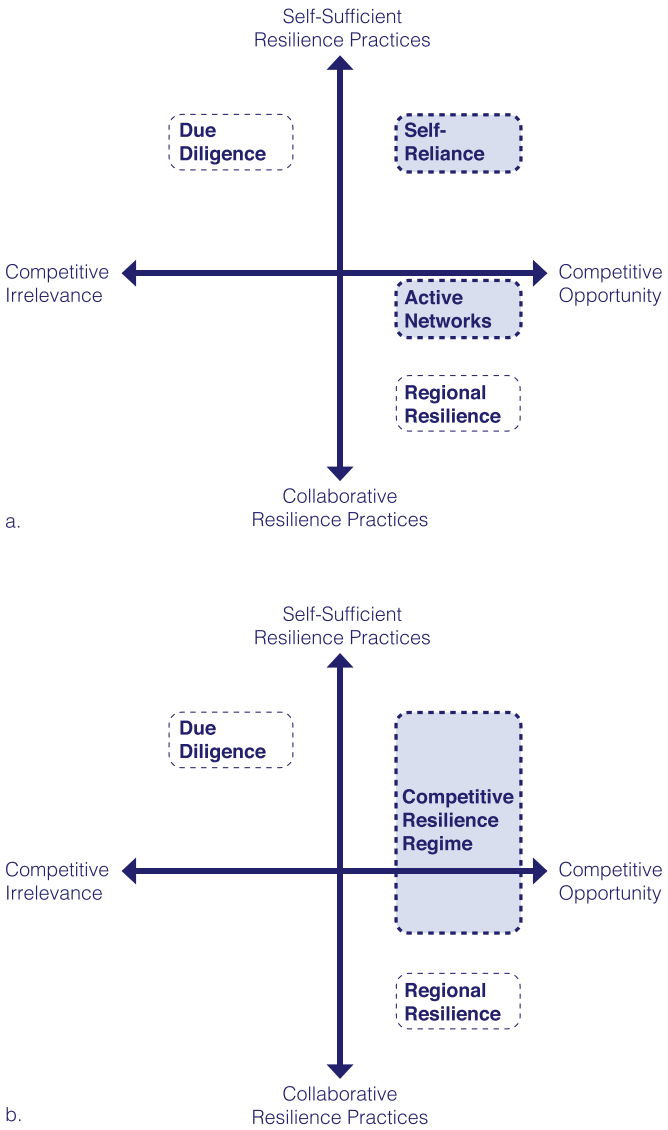

Fig. 2. a. Forms of resilience. The techno-market imaginary can be divided into multiple forms of resilience within the real estate industry depending on attitudes to competitiveness (imaginaries) and organizational collaboration (practices). b. Competitive resilience regime. The two most prominent forms, self-reliance and active networks, are touted as models within the real estate industry and contribute to an ascendant competitive resilience regime.

point while recommending it to others. He also reported looking to international examples and advocating for resilience both within the firm and to public officials at multiple levels of government. A third respondent sat on the board of a national real estate advocacy organization where he worked toward changing building standards.

4.3. Imaginaries and practices co-construct forms of resilience

Not every respondent emphasized turning risk into competitive advantage, and those who did approached the opportunity through differing strategies of self-sufficiency and collaboration. Therefore, it is useful to disaggregate the techno-market imaginary and attendant practices into separate categories, distinguishing forms of resilience. I organize these forms along two key axes: 1. Imaginaries: this axis captures firms' conceptualization of climate risk in relation to competitiveness, and 2. Practices: this axis captures firm's adoption of practices along a spectrum of self-sufficiency to collaboration within larger organizational landscapes. These axes not only reflect techno-market optimism, but also resonate with other strands of the theoretical framework. As growth coalitions promote isolationist ecological security at the urban scale, competition becomes a central, driving force in shaping the built environment. At the same time, the deregulation and devolution of authority central to neoliberal governance in general and adaptation governance in particular suggest that organizations would act autonomously to secure their futures.

Within this framework, four forms of resilience emerge (Fig. 2). When firms view flood risk as irrelevant to competitiveness and

rely on autonomous action to manage risk, they default to a business as usual *due diligence* form. This captures the common assumption that standard due diligence procedures necessarily address all relevant risk adequately. Firms like this exhibit a strong default to relying on insurance as both an adequate measure of and protection against risk. This form of resilience locks in both existing and emerging vulnerabilities, particularly because the mindset suggests little flexibility or openness to examining disruptive conditions.

When firms perceive flood risk as impacting their competitiveness, but opportunistically seek to cap investment in adaptation strategies, they tend toward one of two forms. In *self-reliance*, they organize internally to fortify their assets whereas in *active networks*, they seek collaboration with other public and private entities to maximize constrained resources. In contrast, the *regional resilience* approach embodies the hypothetical ideal of comprehensive, collaborative flood protection which a range of urban leaders within and beyond the real estate industry aspire to. Some firms referenced this as a counterpoint to their own constrained positions, but pursued it incoherently if at all. These four forms each solidify as attitudes, norms, and values (or imaginaries) become concretized through flood risk management practices.

5. Discussion: competitive resilience as an emerging resilience regime

Though proactive flood risk management is currently on the periphery of the largely conservative real estate industry, the activities captured in the *self-reliance* and *active networks* forms are important to focus on here because: 1. They are touted as industry "best practices" and as a result, will likely gain wider uptake, and 2. they already include substantive practices with concrete consequences for current and future adaptation. As the *self-reliance* and *active networks* forms gain prominence within the real estate industry, they build on and reinforce trends in the larger disaster industry, contributing to an ascendant regime of "competitive resilience." While this offers an attractive business proposition for the organizations involved, it is plagued with pitfalls for wider urban adaptation.

The tale of Goldman Sachs' response to an impending Superstorm Sandy circulates as a parable in disaster risk management conferences and conversations, illustrating the broad resonance of these two forms of resilience. In one version, Goldman Sachs sandbagged their building and installed generators to keep the lights on, while everyone outside laughed until the storm hit. When vendors trucked in fuel according to contract to keep those generators running, police stopped them on their way into New York and confiscated the fuel for hospitals. In this version of the tale, Goldman Sachs was uniquely prepared for the storm, but in the ensuing chaos, they were punished for their foresight. In another version of the tale, Goldman Sachs took those same steps. Their building was safe, the lights were on, and they told their employees to work from home because the transit system was under water. But their employees couldn't work from home. They couldn't simply plug in their laptops and carry on as usual because power was out in the whole region. In the first version, the moral reflects the appeal of the *self-reliance* form of resilience and in the second, the moral reflects the appeal of the *active networks* form. The fact that these two interpretations can be so easily ascribed to the same story reflects just how closely linked the two are as two sides of competitive resilience. More importantly, the transformation of this tale into common currency reflects how competitive resilience is capturing real estate imaginations.

5.1. Self-reliance

Embodying a typical Horatio Alger "pull yourself up by your bootstraps" ethos, in the *self-reliance* form firms assume that flood risk could have a sizeable impact on competitiveness but they tend to rely on autonomous responses. Much of the *self-reliance* form is considered "best practice" in the industry, as firms operate on the assumption that the public sector cannot be relied on either for emergency services or for substantial infrastructure. Under these assumptions, firms fortify their assets by purchasing temporary flood barriers, moving mechanical systems, installing pumps and procuring emergency generators. At the extreme end, this form includes avoiding at risk properties, either through shedding them after a negative experience or forgoing acquisition in anticipation of projected risks. In aggregate, avoidance could reach a tipping point, a "flight to safety" away from coastal real estate. This represents a real threat of "unmanaged retreat," leaving those without financial or social capacity to bear the burden of increasingly uninhabitable coastal areas.

5.2. Active networks

In an *active networks* form, firms operate under the assumption that flood risk presents a real threat to competitiveness and that some level of collaboration is necessary to turn that threat into opportunity. In this flexible approach, they enlist resources on an as-needed basis, allowing for the greatest capital agility. This form of resilience includes political, resource, and physical networks, some of which are unintentional.

Though unprompted, some respondents noted their political and resource networks as part of their flood response strategies. This included influence and advocacy with federal roundtables, insurance and real estate industry organizations, as well as transnational resilience partnerships such as the UN R!SE initiative. Respondents also reported resource networks such as contracting with disaster recovery vendors and security consultants to develop post-disaster supply procurement strategies. As these relationships are prevalent among target market firms, the effects are not just concentrated in one city, but diffused across millions of square feet in multiple major centers (Fig. 3).

At the local scale, these intentional political and resource networks can result in unintentional physical networks. For example, at the parcel scale the purchase of a temporary flood barrier initiates a cascading response. Through informal mechanisms of negotiating

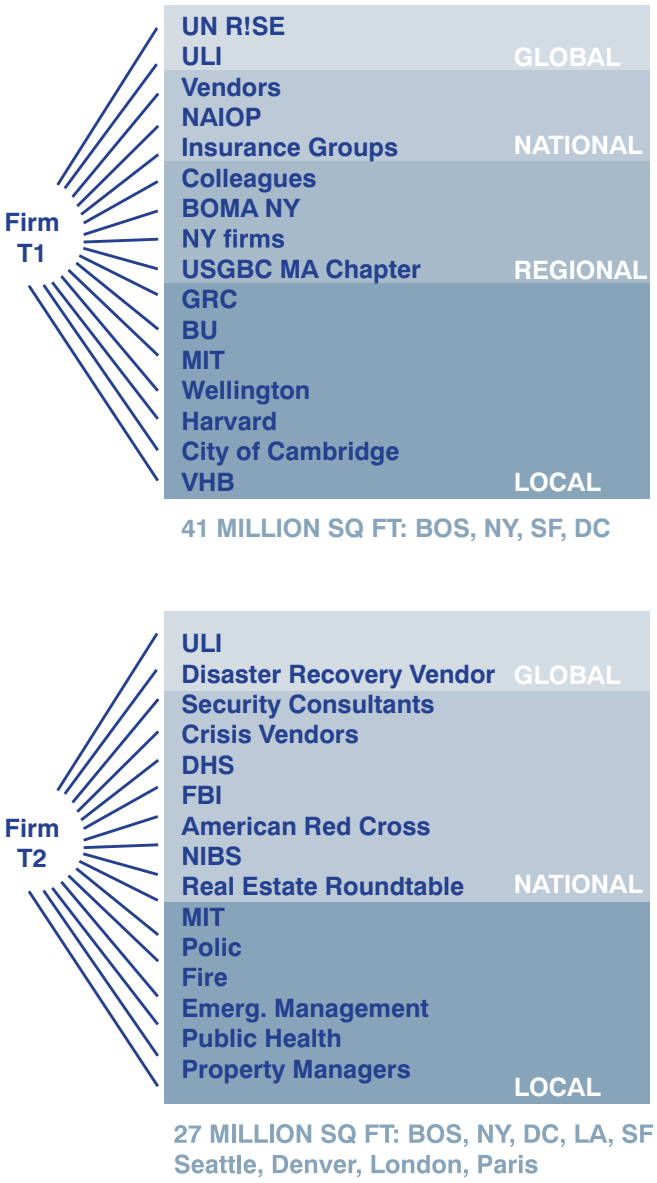

Fig. 3. Diffusion of competitive resilience. Firms operating within the active networks form of resilience leverage extensive networks involving a range of global, national and local organizations across multiple major cities to accomplish their resilience goals.

over property lines, procuring permits, and promoting the product at industry events, the practice of purchasing premium, customized flood protection spreads between firms. In the process of protecting a high-value parcel, one firm promotes these adaptive practices to firms with adjacent parcels. This is not only good business for the flood protection company; as it is beneficial for a particular location, it accentuates uneven risk. When the practice concentrates near its origin, it provides additional security to the original firm while also creating an informal protection district.

At the same time, industry networks are beginning to coalesce around formal protection districts as a policy proposal. This idea has gained currency with a Ceres report on market-based development of “resilience zones,” areas that might operate like business improvement districts with local businesses self-taxing to pay for infrastructural upgrades (Bruggman, 2013). While this idea is only at the proposal stage, A Better City is advocating for it as an appropriate collective response. It has yet to be determined where these formal districts might be developed, but their map of member locations has obvious clusters (Wright et al., 2015), giving an early indication of where efforts might be concentrated (Fig. 4).

5.3. Regional resilience

This final form of resilience serves largely as a hypothetical ideal, embodying the aspirations evident in local planning documents

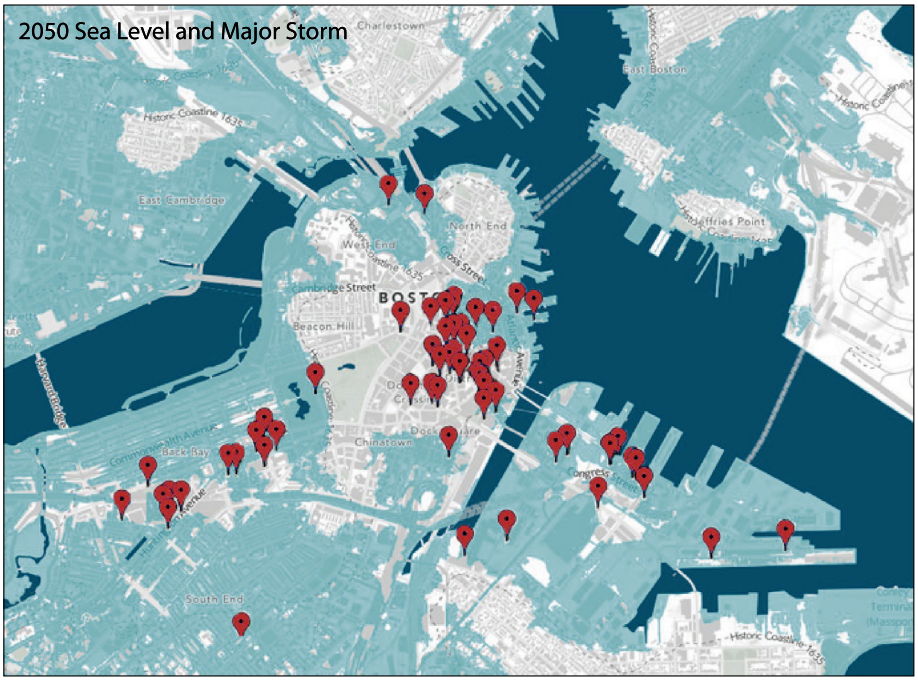

Fig. 4. Local concentration of competitive resilience. A Better City's map of member organizations overlaid on FEMA flood zones (Wright et al., 2015) reveals clear real estate clusters where "competitive resilience" strategies are likely to be located.

and advocacy reports. These ideas have relevance here because they gain broad currency and become reference points for real estate firms as well, particularly when they are visualized and distributed. The "back bay canals" image, first visualized in an Urban Land Institute report (Quinn, 2014), and targeted at a broad development constituency, serves as a case in point. The image of Venetian canals inserted into Boston's Back Bay became a common reference point, often held up for criticism, but also serving as a reminder of a more radically transformed future.

While firms were not taking concrete steps toward this future, they did raise it as a distant goal, and even subscribed to *regional resilience* as an ideal. The Green Ribbon Commissions's Climate Preparedness Working Group espouses a demanding version of this ideal, describing the comprehensive nature of their recommendations: "The re-engineering of a city's building stock and its associated infrastructure to account for a new set of environmental factors is not a trivial undertaking and can be expected to take multiple decades to accomplish. If predicted levels of sea level rise occur, for instance, major changes in the city's buildings and infrastructure will be needed to maintain normal social and economic functioning (GRC, 2013)." However, this idea largely remains a foil, revealing the profound shortcomings of incremental, piecemeal adaptation rather than offering a concrete policy alternative. One respondent who exemplified the *active networks* approach noted a lack of faith in the private sector's ability to address climate challenges and admiration for Dutch and English flood infrastructure, but was simultaneously stymied to pursue a more regional vision through his firm.

6. Conclusion: the pitfalls of competitive resilience

Real estate firms are key agents in urban growth coalitions shaping development and resilience. Though their direct power is clearly circumscribed by larger development and capital networks, these firms do have real influence in the adapting city. Firms that perceive flood risk as a financial risk seek to transform that risk into an opportunity, reflecting the techno-market attitude that environmental challenges have historically become a source of profit when surmounted with incremental, market-based strategies. In that context, leading firms deploy "best practices" to defray flood risk according to two main logics. The *self-reliance* form of resilience relies on resource-capture and self-sufficiency, while the *active networks* form relies on organizational and physical collaboration. Both are closely linked, exemplifying an ascendant *competitive resilience* regime. This market-oriented resilience bears out some of the problematic tendencies toward uneven and inequitable development commonly critiqued in theories of urbanization and climate change. When cities encourage, incentivize and institutionalize *competitive resilience* they tend to prioritize the needs of privileged populations and properties over the needs of the people and built environments most exposed to risk. In the Boston case, these tendencies were particularly evident as private sector actors funneled emergency service capacity toward their specific needs by organizing their own routine emergency exercises and recruiting public and non-profit agencies to attend. While emergency services dedicating time to private exercises may not represent a wholly zero sum trade-off, it certainly poses the risk of siphoning public resources from areas of greater need. These risks were also evident in the development of formal and informal protection districts. While the formal ones have yet to be enacted, the informal ones are arising as adjacent property owners learn from each others' best

practices, and deploy their own resources to implement temporary flood barriers that interlock across parcels. Hodson and Marvin, and the urban scholars that extend their work, warn precisely that this type of elite infrastructural security will serve to exacerbate existing patterns of uneven risk (Anguelovski et al., 2016; Hodson and Marvin, 2009; Shi et al., 2016; While and Whitehead, 2013; Whitehead, 2013). Mark Whitehead explicitly argues that it is essential to understand the limitations of pursuing "urban adaptation as a series of competitive assets (Whitehead, 2013)." The practices evident on the ground in Boston confirm that the marketization of climate change is a multi-scalar phenomenon that risks shifting vulnerability from well-resourced populations to those without the individual means to achieve protection. Shifting vulnerability is one of the central forms of maladaptation, in which even well-intended resilience efforts produce adverse outcomes. From this initial examination, leading real estate industry practices confirm some of the unfavorable tendencies predicted in urban climate theory, suggesting that piecemeal *competitive resilience* should be further evaluated against aspirations for coordinated, large-scale *regional resilience*.

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